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THE EXTENSION PATHOLOGIST

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THE EXTENSION PATHOLOGIST

Vol. 1

No. 2.

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THE EXTENSION SERVICE

No. 1

Vol. 1

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EXTENSION ACTIVITIES RELATING TO ORCHARD SPRAY SERVICE

The conception of a relationship between the college or experiment station and the farmer whereby the obligation of the institution ends with dissemination of control literature is fast passing. Particularly is this true of measures relating to spray work. It is not enough to simply publish methods of mixing and applying sprays for the various purposes. Local conditions frequently require modifications not only of sprays but of machinery which can most profitably be used to apply them.

An excellent example of assistance with problems of this sort is found in the work of Mr. E. L. Nixon of Pennsylvania with certain potato growers of that State. On studying local conditions it was found that these farmers owned small home orchards which by themselves had never justified the purchase of high power spray equipment. By assisting with the organization of potato spray rings and guiding these associations in the purchase of machinery, combination orchard and potato equipment was purchased with the result that these home orchards can now be profitably sprayed as well as the potato fields.

The spray association or ring which has been actively promoted by extension pathologists, entomologists, and horticulturists since 1917 has made possible the profitable use of effective apparatus in many localities where individual farmers had formerly been unable to take advantage of spray recommendations.

Ownership of the best equipment either by individuals or associations is useless, however, if the right spray for the specific trouble is not applied in the correct way and at the opportune time. This often makes desirable the maintenance by the State extension organization of some form of spray service. Efforts in this direction have been made during the past few years in several States. Particularly noteworthy has been the service rendered to farmers in Virginia, West Virginia, and New York State. Differences in extension and station organization have had their influence in developing the work along somewhat different lines in the States, yet one thing is common to all three, and that is the appreciation on the part of the farmers for the value of the service rendered.

We are greatly indebted to Dr. Barrus, Dr. Fromme and Mr. Sherwood for the preparation of the following articles on this phase of their work.--
F.C.M.

THE ORGANIZATION OF A SPECIAL EXTENSION SERVICE

IN NEW YORK STATE

By M. F. Barrus

New York State is noted for its varied agricultural products, but it must not be assumed because of this that each farm produces all these or any number of them. Indeed, there exists throughout the state many localities in which one or a few related crops are very specially grown. The growers of these special crops have come to recognize that they have sustained and are continuing to sustain heavy losses from diseases and insect pests which they are unable to control successfully. These losses have been emphasized particularly during years when there have been extensive outbreaks of diseases or of destructive insects. At such times the growers have appealed to the College of Agriculture for help in solving these problems.

From the beginning of the organization of the Department of Plant Pathology in 1905, an effort has been made to meet the appeals of growers for special help in controlling plant diseases through the organization of industrial fellowships. By means of them the problems of the growers have been given special attention by students under the supervision of research professors at the college. These fellowships have been supported by funds provided by the growers themselves or by agencies interested financially in solving the problem. The fellow appointed, while primarily interested in the investigation of some plant disease, has of necessity endeavored to produce tangible results for the growers by instructing them regarding known measures for disease control, and particularly in giving them timely and accurate information. They have also been able to forecast the growers' needs for materials and apparatus so that they were provided when the time came to use them. These fellowships have been successful in meeting a real need and still continue to serve groups of growers requiring such service.

During the war, every emphasis was placed upon food production and in considering the problem here, it seemed that much could be accomplished by placing in each of a number of our large crop-producing counties, a man having training in disease and insect control so that the growers in such counties would be able to receive timely and accurate information regarding control measures in much the same manner as growers receiving the benefit of the fellowships. As money was available from the state and federal government for such work, it was not necessary to limit the service to growers supporting it. During 1917, thirteen counties were served in this way but during 1918, due to the scarcity of qualified men, only six counties received this service.

After the war was over, the state and federal funds for this service were withdrawn but the service itself was so satisfactory that demands were made by some of the counties to have it continued. This was possible only on

condition that the service be supported largely by the agricultural interests of the counties receiving the benefit. At first only six counties arranged to do this, but the number of counties receiving such service in whole or in part has gradually increased so that during 1923 there were eleven counties. The number will probably increase slowly from year to year but will never include all the counties for the reason that there are several in which crop production is not sufficiently specialized to warrant the expenditure necessary for such work.

The purpose and organization of this special service work at present is outlined in our project from which I quote freely. It is called a seasonal program for the control of plant diseases and insect pests to be conducted under the direction of a special field assistant and under the supervision of leaders, one from the Department of Plant Pathology and one from the Department of Entomology.

The purpose of this project is to provide a special man to assist the County Agent in conducting a general program for disease and insect control of fruit, potatoes, or of any crop for which there is a demand on the part of the growers, or for the conducting of any demonstration receiving the approval of the county agent and of the departments of the College concerned. The amount of work, however, must be limited to that which can be conducted with efficiency.

A field assistant with good fundamental training along the lines of plant pathology and entomology is stationed in the county as early in the spring as necessary and continues therein during the growing period, usually six months. He has direct responsibility for the details of conducting the demonstration projects and in attending to such miscellaneous demands for information and assistance on the control of plant diseases and insect pests as his time will permit. It is understood that the field assistant undertakes this work for the primary purpose of conducting the insect pest and disease control work agreed upon and that he is to undertake no other duties that will in any way interfere with this work. He keeps all records of his work, the time spent in the office and in the field, miles traveled, visits made, etc., and submits in triplicate a monthly report of his work, a final report, and such other reports as his leaders may require; one copy of each of which is filed with the county agent, one with the Department of Plant Pathology, and one with the Department of Entomology.

The New York State College of Agriculture cooperates in this project by providing salary at the rate of \$50.00 per month for the field assistant, who is appointed upon the recommendation of the leaders subject to the approval of the Farm Bureau Executive Committee; by supplying him with such laboratory equipment as is necessary for the proper and effective conduct of his work; and by giving him supervision through the leaders of this project or other specialists whom they may assign to the work, who through visits and correspondence continually assist him and check up his work. The county Farm Bureau organization cooperates by providing the field assistant with office room and facilities for office work, including telephone and telegraph expenses, and by allotting him space in the

Farm Bureau News for news items. The county Farm Bureau organization pays a part of the transportation of the field assistant to and from Ithaca not to exceed three times during the season on call for conference, the remainder of this expense being paid by the college; provides him with an automobile for full-time use within the county; maintains the car and pays all other necessary traveling expenses within the county when he is away from his headquarters; pays an additional salary of \$100.00 or more per month; and gives such other aid as is necessary for the proper prosecution of his work.

It has already been pointed out that the field assistant must have fundamental training in plant pathology and entomology. Such men are usually secured from among the ranks of graduate students either here or at some other institution. The position is an attractive one for graduate students for it not only provides them with funds which aid them in continuing their graduate work but it also gives them very valuable training for their profession. The experience of meeting the farmers' problems at first hand and of cooperating with the grower in solving them cannot be obtained in a laboratory and yet is of the greatest importance in fitting a plant pathologist for his work in the profession. The men are selected for this position with the greatest care. Consideration is given to academic and special training and to farm experience, and also to personal qualities indicating adaptability to such work. Other things being equal, preference is given to men acquainted with the agricultural conditions and problems to be met. When the Farm Bureau organization desires it, the assistant county agent is appointed as special field assistant, provided he is qualified and that he will devote his whole time to his work during the season. A movement is now on foot to appoint qualified county agents to this position provided there is an assistant agent to take over the other duties of the agent while he is acting as field assistant. Our object is the accomplishment of the work and appointments are made only with this object in view.

During the last week in March which just precedes the departure of field assistants to their field of duty, all men appointed to these positions are required to attend a special school held at the College for five days to acquaint them with their special problems and to give them such instruction, information, and advice as will help to equip them for their duties. Such members of the staff at the College and at the Geneva Experiment Station prepared to do so, give lessons and talks at this time and field assistants, who have had previous experience, aid in instruction at this school. Hypothetical problems are presented and the men are required to outline a procedure for meeting them. They are required to draft spray calendars for the different crops and these are criticized by all. Instruction is given in the preparation of circular letters, news items, and reports. At the close of the school each field assistant is provided with a manual containing special information for him and with a set of bulletins that he may need. The school is valuable in preparing the men for their work, but even before the school opens, all new men are advised regarding their problems so that they may have opportunity to get as much information as possible.

It may be interesting to know just how the object of this project is accomplished. This can best be told briefly by confining our description to the

work in a particular county, and so I will use as an example the service extended to a fruit county. The special work of the field assistant in such a county is to develop and maintain a Spray Information Service. Their first job after getting settled is to confer with the county agent in regard to farmers to be served, their location in the county, and the roads to be traveled to reach them; the zones of fruit development in the county, for in no county does the fruit develop uniformly throughout it; and the type of demonstrations to be conducted. A series of visits must be made to growers requesting this service in order to advise them regarding materials and equipment needed and observations must be made respecting the amount and kind of fruit grown and development of disease pathogenes and insects that must be combated. Circular letters must be prepared and sent out to all growers regarding the time and materials necessary for the first application. The Farm Bureau office force usually attends to the work of compiling a mailing list and sending out the letters as well as getting in touch with the growers by telephone.

As one of the most important duties of the field assistant is to decide upon the most suitable time for making application as well as to provide a formula for the preparation of material used in spray or dust, it is necessary for him to have information, as accurate as possible, from day to day regarding the development of buds, flowers, and leaves of fruit trees in the different zones in the county; development of parasites and materials most effective in controlling them; and the probable weather conditions during the next few days. He obtains his information regarding development of trees and of parasites from his own observations on trips about the county; he is supposed to know the best means of control of parasites, and his information regarding weather is supplied him through cooperation of the U. S. Weather Bureau located at the College. The cooperation of the Weather Bureau is very essential to the success of the Spray Information Service. A special weather forecaster located at Ithaca, is appointed by the Bureau for April, May, and June and long range meteorological reports are sent directly to him. From them each night he prepares a special forecast for this service and this is wired to the counties having special field assistants so as to reach them before midnight. Arrangements for the reception of the telegrams must be made by the Farm Bureau in each county. Basing his judgment upon the information he has received from these sources, the field assistant must decide what is the most opportune time for making an application. The time for the delayed-dormant and the calyx applications for apples is not very difficult to decide upon but during the pre-blossom period the field assistants usually sweat blood for they realize how much depends upon their judgment.

After a decision has once been reached it must be communicated as quickly as possible to the growers, especially during critical periods. They have, however, been advised previously by circular letter stating that an application will be necessary in a few days and giving the formula of the materials needed, but the exact time when the application should be made is not given during critical periods. This "spray warning" is sent, as soon as a decision has been made, by a system of telephone relays, from the Farm Bureau office. The county agent selects a certain key man on each line of each exchange having subscribers who are to receive the warning. These key men receive the message from the Farm Bureau office and each relays it to three other persons on their line. Each of these persons relays it to

three others and so on until all have been reached. Each telephone relay man has the name and telephone number of the persons to whom he is to relay the warning tacked on the wall near the telephone. He has there also the spraying schedule to be used throughout the season for each fruit so that he knows when he receives the warning just what application is meant. The warning may read somewhat as follows: "Apply pre-blossom application to apples today. Rain expected day after tomorrow". Some county agents have all applications codified and send the warning in code form. A card, containing the information sent by telephone, is mailed out the same day so that, should there have been any breakdown in the telephone service, the warning will reach all growers later by mail.

It is our experience that most growers receiving this service, act promptly on this advice. There are more than a thousand spraying machines set in motion by these warnings. The growers depend upon them and do not usually act until advised. It is surprising how much more promptly the grower acts upon definite advice from a field assistant than when acting upon his own information. In the latter case he often delays a day or two, while he starts at once when told even when he must drop other work. The field assistant makes a trip about the county the day the message is sent and if any of the growers whom he sees are not making the application recommended, he naturally inquires why. There usually are apologies, for the grower recognizes that he has been remiss in his duties. It is not possible to visit all growers after each recommendation; but a check in their activities is kept by means of a form provided each grower on which he records the date of each application, the formula followed, and the amount of material used.

It must not be assumed that all growers faithfully follow throughout the season the advice they receive. There are many circumstances which may interfere, and some of them do. Some of the growers who fail to follow recommendations in every respect are willing to admit it, but there are others who perhaps think they have done so and who have not been successful in growing perfect fruit. They are the ones who are likely to complain, so that it is necessary to have some evidence at hand to convince such persons that the program, if correctly followed, would give results. The field assistant himself wants some check upon his own recommendations also. This is provided by means of criterion orchards, at least one of which is located in each zone. The orchards selected for criterions are representative ones for the region, the owners of which agree to carry out faithfully and promptly every recommendation made by the field assistant, who himself often makes the application. There are criterion orchards not only of apples, but also of other fruit when these are important in the county. Usually a few trees in each of these orchards are left unsprayed as a check. These orchards serve to demonstrate the value of the recommendations made. It must be said to the credit of the field assistants and of the owners of the orchards that they have almost invariably served their purpose well. This has been determined by making counts of the fruit on sprayed and unsprayed trees in the fall.

In most of the fruit counties, the fruit work occupies all of the time of the field assistant during the first three months he is in the field. During the last three months the fruit work is not so strenuous although

attention must be given to emergency sprays during the summer and there are fruit tours to be arranged and conducted. However, in some of these counties, considerable attention is given to potatoes, especially to spraying recommendations and to roguing seed plots. The field assistantship work is not confined to fruit growing counties. Such a service was conducted for several years in a truck crop county and the assistant devoted his entire time to diseases and insects of truck crops. For the past two years such a service has been in operation in an important vegetable growing county. The problems to be met in these counties are just as numerous and just as much tact and ability is needed by the field assistant in meeting them as in the case of fruit growing counties. The service is valuable in any county where special crops are grown.

It should be emphasized here that such a service cannot be successful without constant and intelligent supervision. The leaders from both cooperating departments are constantly in touch with the field assistants through visits, by correspondence, and by telegrams. Without such contacts, some of the field assistants would become discouraged and dissatisfied with their work. Usually one summer conference is held at which all assistants and leaders are present. Other members of the staff at Ithaca and at Geneva and at the State Department of Agriculture at Albany, visit the field assistants from time to time. Nor is the cooperation at the College entirely confined to the two departments mentioned. The members of the staff of the Department of Pomology and of the Department of Vegetable Gardening have rendered invaluable service in visits and in helpful suggestions at the special school and in the field. The cooperation of the Weather Bureau has already been mentioned as essential to the undertaking. The assistants are also kept in touch with one another by means of the Weekly News Letter, a mimeographed sheet, prepared at the College from reports of the field assistants, fellowship men, and county agents contributing, and also including timely and useful articles prepared by various experts. This is issued every Monday during the greater part of the season and is sent to all field assistants and to those fellowship men and county agents who will reciprocate by sending in reports of conditions in their localities. It is also sent to other persons interested in the material it contains.

On the basis of the number of persons who receive the service, counties having field assistantships may be separated into two classes: those in which the service is extended to every person requesting it and those in which it is restricted to a group of growers located in some part of the county and who have a common special crop. The tendency at present seems to be to make the service county wide. In such cases the funds from the county necessary for its support are usually provided in the Farm Bureau Association budget. The field assistant in such cases is of necessity unable to visit all growers receiving the service for there are usually five to six hundred men on the list, but all growers receive the information through circular letters, cards, and telephone messages, and visits are made upon request. In the case of the limited service, the field assistant visits all the growers periodically for there are usually not more than forty to fifty of them. He is, therefore, able to give them much personal attention. The support of such a service, except that given by the college and in some cases by the Farm Bureau, is provided by those receiving the service.

The cost of this service for six months varies in the different counties but runs from about \$1200 to \$1500, of which \$300 is provided by the College. The method of raising this money in the county varies in the different counties from almost complete support directly by the growers receiving the service to entire support by the Farm Bureau Association and thus indirectly from all members.

Usually the growers receiving the service contribute directly in some measure to its support. The ideal method is for the grower to pay in proportion to the service he received for in doing so he becomes more interested in making use of it in order to get returns on his investment.

The question naturally arises, "Does this service pay for itself?" I will answer by asking whether growers would continue year after year to support it if it did not. In five years the service has been extended from six counties to eleven counties. One county has had it for seven years, in fact ever since it started, and others almost as long. No attempt has been made to urge the service on any county but it has been allowed to sell itself. We have many records on file of direct benefits received from it amounting to many times its cost but it is impossible to review them here. There have been instances where it has not been as successful as we could wish, cases where the field assistant appointed was not adapted to the work, but taken as a whole, the service has given general satisfaction. The organizations of the Packing Associations in the state have emphasized the importance of clean fruit and the Western New York Fruit Growers Co-operative Packing Association, Inc. has come out strongly in favor of pushing the organization of a spray Information Service among all their local organizations.

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SPRAY SERVICE FOR FRUIT GROWERS IN VIRGINIA.

By F. D. Fromme.

Spray service for the benefit of Virginia fruit growers was established in 1922 and was again in operation during the season of 1923. Information is acquired and disseminated cooperatively by the departments of Plant Pathology, Horticulture and Entomology. A spray calendar is prepared and distributed in advance of the season. This contains advice as to the materials to be used, methods of preparation and approximate timing of applications. Exact dates for spray applications are supplied to the orchardists during the growing season, these being based on information received from field laboratory workers. The spray recommendations are based on field observations as to the seasonal development of insects and fungus diseases and the development stages of the host. This information is obtained at the present time from three separate sources.

1. The field laboratory at Winchester in the northern part of the Shenandoah Valley. This station is maintained by the Virginia Agricultural Experiment Station in cooperation with the State Entomologist. A field entomologist and a field pathologist are detailed for research work in their respective fields. Both devote practically their entire time to fruit pests and diseases. Critical dates for spray applications are determined by the field research men in consultation and are then wired to Blacksburg for dissemination to fruit growers in the counties where conditions are similar to those of the Winchester section. The Spray Service Committee at Blacksburg, composed of one representative from each of the three cooperating departments, prepares the spray service wire and transmits it to the county agents and the secretaries of county Fruit Growers Associations, who then disseminate it to the fruit growers by telephone, mail, and through the local press.

2. A research entomologist is maintained at Leesburg in the northern Piedmont section by the State Entomologist who provides information on seasonal development of insects for that section and transmits it to the Spray Service Committee where it follows the same course as detailed in the foregoing.

3. The third source of spray information is provided at Crozet in the middle Piedmont section. A research pathologist employed by the Experiment Station is located at this point. He transmits advice relating to fungous diseases and also makes observations on a minor scale on the development of aphid and codling-moth. Advice from this station is applicable to the leading fruit counties of the middle and southern Piedmont.

A fourth fruit section which is not served directly as yet with field research men is the southwest section which centers at Roanoke. Recommendations for this section are based at the present time on observations made at Blacksburg, and information from other fruit sections is utilized in so far as it can be applied.

The chief apparent disadvantage in the method of disseminating information is the delay involved in transmitting advice from the field worker to the Spray Service Committee, from them to the county agent, and from the county agent to the grower. In practice, however, there is little time lost. The committee is prepared and anticipates the receipt of advice from the field and transmits it promptly. If the county agent is prepared to handle his end of the work with dispatch the grower gets the information almost as soon as though it came directly from the field worker. It may be argued, also, that no advantage can be taken of local weather conditions in the timing of applications, and this is perhaps a real disadvantage in the control of scab. As a matter of fact, however, there are comparatively few growers who can complete a spray application in less than five days, and some require from seven to ten days, and in a few instances as much as fourteen days. We are dealing with a general condition in which the grower is not properly equipped to cover his orchard at critical periods, and are continually preaching the doctrine of more and better equipment. Until more equipment is secured there is little real advantage in weather forecasting. The grower must take a certain amount of chance with the weather, but if he takes advantage of every opportunity and is not too seriously underequipped he gets results.

Results from work of this nature are difficult to measure. The severity of pests and diseases varies from season to season and no general comparisons can be made except over long periods. As a rule the men who have followed the spray service recommendations to the letter have had the best fruit in their communities. These men are thoroughly sold as to the value of the work and will continue to follow it. Others who have followed in part and used their own judgement in part will undoubtedly fall in line in the future. Attention has been effectively directed to the need for more and better spraying, and the consumption of spray materials has been greater in the past two years than during any time in the history of apple growing in the State. Much of the miscellaneous hit-and-miss spraying has been eliminated. Improvement for the present will be directed towards securing additional field research men and facilitating the distribution of advice.

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ORCHARD SPRAY SERVICE WORK IN WEST VIRGINIA.

E. C. Sherwood

Work for 1923.

A. Introduction

The orchard spray service work as carried out during the season of 1923 was a continuation of work started in 1922, but on a much larger scale. The plan for 1923 was developed after due consideration of the experiences of the previous season and of the conditions generally prevailing in the orchard sections of the State.

A brief survey of the situation upon which the plan was based is presented. During 1922 spray service work was attempted only in Berkeley County, but growing demands for assistance made it necessary to extend the service to Jefferson, Morgan, Hampshire, Mineral, Hardy, and Grant counties, and also to a more limited extent to various counties in the central and western parts of the State. Many types of growers were thus represented, ranging from those who were engaged strictly in commercial fruit growing to those whose major farm operations were other than fruit raising.

The average size of the orchards in the commercial sections of the State is relatively large. Many growers handle from 100 acres to 400 acres of fruit. Since these orchards were started when a very limited amount of spraying was considered necessary, they were often planted on mountain sides or other rough ground without any consideration as to facilities for spraying. Great mechanical difficulties are thus encountered, and many orchardists are still seriously under-equipped with machinery. It is a very common practice to try to handle as much as 100 acres of large trees with one power sprayer. Unfavorable production and marketing during the past three years, together with the high cost of production, have not made it possible to purchase sufficient equipment of improved types, even though the need is now fully realized.

Many of the larger orchards are held by companies or by individuals who take little part in the actual management. While such owners are interested enough personally in proper spraying measures, much information they obtain is merely relayed to the people who actually do the work in such a way that its importance is not realized.

Varied weather conditions cause another set of complications. Local differences between the mountain areas and the low-lying orchards cause several days difference in the time to apply sprays. The difference in time of application for various parts of the State varies still more widely.

Both diseases and insect pests are very generally increasing in importance as factors in production. Apple scab is generally the most important disease that is the limiting factor; however, sooty blotch, black rot, bitter rot, cedar rust, and apple blotch on certain varieties are of great importance. Certain other diseases including the New England fruit spot and *Volutella* rot are becoming more important.

In carrying out the service work no field assistance was available other than that of the county agents. None of these has had any training in plant pathology.

B. Seasonal Activities.

I. Preparation and Promotion Work.

This phase of the work really began at the annual meeting of the State Horticultural Society at Charlestown in February, where the writer was called upon to address a meeting of some 200 growers on the subject of apple scab control. This occasion was also taken to ascertain the sentiment of the growers with reference to a spray service program, and to make some explanation of the service that might be rendered. With the help of the county agents, meetings were then arranged in various orchard sections at which talks were given similar to that given at Charlestown. Twenty five such meetings were held with a combined attendance of 750 people.

These talks on subject matter were illustrated by means of a set of charts designed for the purpose. They were intended (1) to give a better understanding of the nature and cause of plant diseases, and of the principles underlying the application of fungicides; and (2) to give suggestions regarding more efficient application of sprays. The following points were emphasized: the necessity of preventing the disease from becoming established; the real function of the fungicide; that the effectiveness of the application depends upon the use of efficient machinery, the use of the right materials kept at proper strength, and the applications made at the right time; that the right time depends upon the seasonal development of the fungus; and the relation of fungus development to weather conditions.

A typical disease such as apple scab was considered from the standpoint of the life history of the fungus, and it was pointed out how the spray schedule was developed for its control. The spray schedule as a whole was considered as a combined schedule for the prevention of both disease and insect pests, and certain additions and variations suggested for the control of special diseases or insects. Finally, the meeting was opened for questions.

2. Activities During The Spray Season.

About March 25, headquarters were established at the State Demonstration Packing Plant at Inwood in Berkeley County. From this point visits were made during the season to various orchards in order to study conditions and obtain material for laboratory work. The information thus secured was made the basis for seven spray service notices which were issued during the season. These notices were run in the local papers and were printed on our regular letterheads and mailed directly to all those who desired them. The notices contained timely information regarding each of the regular sprays and covered some special sprays and other features of general interest as the occasion arose. Our notices were perhaps somewhat longer than are usually used, but some subject matter was included at the request of the growers.

Field visits were made possible through the cooperation of the county agents and the Superintendent of the Packing Plant. Assistance in this phase of the work was also given by the Extension Horticulturist. These visits afforded opportunity to correct certain spraying practices, to improve equipment, to check up on the kind and quality of spray materials used, and to improve methods for making lime-sulphur concentrate.

3. Activities During the Packing Season.

When the harvest season began, arrangements were made to spend enough time in the apple section to make observations as to the results of the season's work. Besides many individual growers, community packing plants at Inwood, Shepherdstown, Romney, and Keyser were visited. Counts were made of various lots of culls of different varieties to ascertain the character of damage. Much information on varietal and sectional distribution of apple diseases was obtained. This information will be made use of in the next season's work.

C. Results for 1923.

In this phase of Plant Pathology extension work, no arrangements were made for actual result demonstrations. In the division of the work in this State, the Extension Horticulturist has been charged with such work. His demonstrations, however, have been conducted strictly in accordance with the spray service recommendations. In a general way it is considered that the most important results of the spray service have been as follows:

More sprays have been applied than ever before. Growers who have been depending upon two or three sprays applied from four to six regular sprays, as well as additional and special sprays as needed.

Control of apple blotch on North Western Greening, Smith Cider, and Pippins was obtained in orchards where heretofore control has never been satisfactory. This was done by beginning to apply Bordeaux mixture earlier than had been customary.

Many more growers used the standard spray materials which are recommended by the Experiment Station.

The quality of home-made lime-sulphur concentrate has been greatly improved, and the dilutions properly made after testing the concentrate with the hydrometer.

The cluster bud or "pink" spray was almost universally applied. This important spray has very generally been omitted in the past. Growers have had opportunity to learn more about the diseases prevalent in their own orchards and in the section as a result of personal visits and field meetings.

Through our meetings at which subject matter was taken up and illustrated by means of the charts before mentioned, the growers have a better understanding of the nature and cause of disease, and are able to appreciate more than ever before the importance of timely applications. This leads in turn to improvement of mechanical facilities and to making many other advance preparations which will facilitate the work during the spraying season.

The spray service notices were sent out to 300 growers. These were all growers who had asked for the service, hence, the very general application of the information contained in the notices was practically assured. These 300 growers represented a combined holding of about 500,000 bearing trees.

County Agents in the territory covered have had opportunity to learn more about diseases and methods for their control and will consequently be able to render more efficient help another year.

II.

Plans for the future.

Plans for 1924 provide for a continuation of the spray service work along lines very similar to those used during the past season. Improvements and additional features have been planned as follows:

The mailing list will be greatly increased.

Better laboratory facilities will be provided at Inwood.

Spray service notices will be improved by the use of illustration whenever possible.

Special demonstrations on making Bordeaux mixture will be given where the use of this fungicide is necessary.

A campaign will be made to make more use of late season sprays for special diseases.

It is expected to secure the cooperation of a number of growers in the matter of keeping actual cost records of their spraying operations.

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DIRECTORY OF EXTENSION PLANT PATHOLOGISTS.

During the calendar year 1923, seventeen States have maintained Smith-Lever projects in Plant Pathology. Some of these States employ one man, others more than one, for full time work as Extension Pathologists; some employ one or more men on a part time basis for this work, the remainder of their time being given to college teaching, research work or perhaps extension work in Entomology.

The States which have such work under way, as well as names and addresses of men who are handling the extension work in Plant Pathology, are given below: - F.C.M.

<u>State</u>	<u>Name</u>	<u>Address</u>
Alabama	L. E. Miles	Extension Service, Alabama Polytechnic Institute, Auburn, Alabama.
Delaware	J. F. Adams	Extension Service, University of Delaware, Newark, Delaware.
Florida	John R. Springer E. F. DeBusk	Extension Service, Experiment Station Building, Gainesville, Florida.
Indiana	Charles Gregory	Extension Service, Purdue University, Lafayette, Indiana.
Iowa	Donald Porter	Extension Service, Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa.
Kansas	E. A. Stokdyk	Extension Service, Kansas State Agricultural College, Manhattan, Kansas.
Maryland	C. E. Temple R. A. Jehle	Extension Service University of Maryland, College Park, Maryland.
Minnesota	R. C. Rose	Extension Service, Department of Agriculture of the University of Minnesota, University Farm, St. Paul, Minnesota.

<u>State</u>	<u>Name</u>	<u>Address</u>
New York	M. F. Barrus C. Chupp E. F. Guba R. S. Kirby	Extension Service, New York State College of Agriculture, Ithaca, New York.
North Carolina	G. W. Fant	Extension Service, North Carolina State College of Agriculture and Engineering, Raleigh, North Carolina.
Pennsylvania	E. L. Nixon	Extension Service, Pennsylvania State College, State College, Pennsylvania.
South Carolina	W. D. Moore	Extension Service, Clemson Agricultural College of South Carolina, Clemson College, South Carolina.
Utah	B. L. Richards	Extension Service, Agricultural College of Utah, Logan, Utah.
Virginia	James Godkin	Extension Service, Virginia Polytechnic Institute, Blacksburg, Virginia.
Washington	G. L. Zundel	Extension Service, State College of Agriculture, Pullman, Washington.
West Virginia	E. C. Sherwood	Extension Service, College of Agriculture, West Virginia University, Morgantown, West Virginia.
Wisconsin	R. E. Vaughan J. W. Brann	Extension Service, College of Agriculture, University of Wisconsin, Madison, Wisconsin.

ANNOUNCEMENTS

THE EXTENSION SESSION AT CINCINNATI.

It is desired to call attention to the Extension Session which will be held during the meetings of The American Phytopathological Society. This session will begin at 2:00 P.M. Monday December 31, with Dr. M. F. Barrus as chairman. At this time each extension pathologist

representing a state will be given an opportunity to present a brief account of the work he has had under way for the past year and the methods employed to make his efforts effective. It is desired that in making these reports the emphasis be placed on extension methods. Ten minutes will be allotted to each state representative for this purpose. Following each individual report there will be given opportunity for general discussion of the methods outlined, and it is expected that much interesting material will be brought out.

In addition to the presentation of these reports from the various states, the subject of Illustrative Material as formerly announced will be taken up for consideration. It is desired that instances of effective use of charts, lantern slides, and motion pictures be reported at this session. Plans for future development of this type of material will also be discussed.

NATIONAL REPORT ON EXTENSION WORK IN PLANT PATHOLOGY.

"What is being accomplished by expenditure of money on extension work in plant pathology?"

In order to answer this question to the best advantage one would have to spend considerable time in the study of miscellaneous reports, for there are at present no summaries of the work done during past years. It is the intention of the Washington office to prepare and print such an account of the work done in the calendar year 1923. We will have as sources of information for this purpose: (1) reports of extension directors from the forty-eight states; (2) the annual reports of state extension pathologists to their directors; (3) annual reports of state extension horticulturists and agronomists; (4) annual reports of county agents (both statistical and narrative); (5) data secured during my visits to the states; and (6) special reports on individual projects from state extension pathologists. The bulk of the information which will go into the making of this summary will necessarily come from reports of the state extension pathologists. Unless the work done during the year in every State maintaining a pathological project is covered rather fully in the annual report of the specialist, the picture that will be obtained by assembling all material received in Washington will not be a true one.

The writer hopes that when these annual reports are received from the states they will be found to contain material, the study of which will enable us to put back into your hands sometime during the spring months this printed review of extension work in plant pathology as conducted in the United States for the year 1923. In this we hope to be able to point out the things that have been attempted, the results accomplished, and the methods by means of which these results have been brought about. - F.C.M.

FRED C. MEIER, Extension Pathologist,
Office of Cooperative Extension Work and
Bureau of Plant Industry Cooperating.



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